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Donna Creek Biodiversity Project: Spring 1995 Breeding Bird Surveys Summary Report

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This report has been approved by the Peace/Williston Fish and Wildlife Compensation Program Fish Technical Committee.

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INTRODUCTION

The Donna Creek Breeding Bird Survey Contract was one part of the Donna Creek Biodiversity Research Project being conducted by the Peace Williston Compensation Program. 1995 was the second year that bird surveys were conducted in the Donna Creek Drainage (preliminary surveys were conducted in 1993) and the first year that point count survey methods were used. 149 permanent points were established in three different treatment areas, and in clear-cut and old-growth control areas. Behaviour data were obtained on three cavity nesting species that were considered to be inadequately sampled using the point count technique. Nests of cavity nesters and species using islands for nesting were located. Field work was completed by Jeffrey Joy, Ruth van den Driessche, and Michael Murphy. Below is a summary of the methodology used to fulfill the expectations specified in the contract.

METHODOLOGY

A. Census Point Location

Points were located in a total of six cutblocks and three old growth areas. There were three cutblocks divided into 4 quarters (3 treatment areas and 1 clear-cut area per cutblock). Points were also located in 3 old growth control areas adjacent to the three cutblocks, and 3 clear-cut areas in fully clear-cut blocks. Point locations were made according to maps provided by the contract monitors. Each old growth, clear-cut, and stub treatment had 7 points per treatment. Tree Island (TI) and Stubs and Islands (SI) treatments had a variable number of points per treatment depending on the number and size of islands in the treatment. There was one point in each of the three islands in both the SI and TI treatments of 5546, and one point in each of the four islands in 5547 SI, 5547 TI and 5516 SL. An exception was made for points 5516.TI.3 and 5516.TI.4 which were located in the same island as the area of this island was 4.6 times greater than any other island. Thus, five points were located in four islands in the TI treatment of 5516. Some of the point locations were altered from the original designated position to conform as much as possible with the 125m inter-point distance guideline, to increase sampling efficiency, and to rectify variation between map treatment boundaries and actual treatment boundaries. The small area of some treatments made it impossible to maintain the 125 metre inter-point distance. Points never overlapped and the minimum distance between points was 115 metres. Details of inter-point distances and bearings can be found in Appendix I. As permanent points were installed locations were marked on blank block maps provided by the contract monitors (Appendix II).

B. Census Point Marking

Each point was uniquely identified with a combination of angle iron stakes, tree tags, spray paint, and flagging tape. Angle iron stakes were driven into stumps where possible to increase visibility and to mitigate the effects of vegetation growth during the breeding season. The compass bearing (Declination 22.8°) to the next point was marked on a metal tree tag and nailed to the nearest log, stump, or tree at each point. Flagging tape was placed on a long stick or metal rod and driven into the ground near the point centre to elevate it above growing vegetation. Spray paint was placed on an object at the point centre to increase point visibility. Each point stake was inscribed with an identifying code (eg. 16.SI. 1). The code consists of a combination of the last two numbers of the block number (5516 becomes 16), a two letter abbreviation for the treatment type (Stubs and Island becomes SI), and the point number (1).

Table 1.1 Treatment Codes

Treatment type	Treatment Code
Old Growth	OG
Clear-cut	CC
Stubs	SB
Tree Island	TI
Stubs and Islands	SI

At each point in the CC, SI, TI, and SB treatments, fifty metre marks were measured using hip chains and marked with two pieces of lime-coloured flagging tape. This provided a reference point for surveyors conducting point counts.

C. Transect Marking

Each transect begins at a tie point placed on a stump, log or tree adjacent to a major road and marked prominently with spray paint, flagging tape and a tree tag. Transects follow compass bearings and are delineated with flagging tape placed as high as possible to remain visible despite vegetation growth.

D. Breeding Bird Surveys

Point count censusing took place between May 22 and June 26, 1995. Surveys were conducted between 4:15 am and 10:00 am. A one minute settling period was allowed before beginning Island and Old Growth points. The island boundary was drawn on point count data sheets in order to distinguish which birds were actually in the island. Clear-cut points were begun upon reaching the point edge in order to include birds flushed from the point during approach. During the first six rounds each observer completed two full rounds. The final round was split between "Jeffrey and Ruth". Each round was fully completed before the next round commenced.

E. Timing of Surveys

Temporally, the surveys went much better than expected. Interruption by rain occurred on only four days during the breeding season. In order to account for late migrants, surveying did not occur on seven other days. With three observers, a very early dawn, and closely spaced points it was possible to complete up to 51 points in a morning. Exact details of survey times can be found in Appendix III.

F. Size of Islands

Islands were measured at the beginning of the project. The dimensions were measured in two directions through the point centre (Appendix IV).

G. Behaviour Surveys

Behaviour surveys for Mountain Bluebirds, American Kestrels, and Tree Swallows took place after the morning point count surveys in the same block as the point counts were conducted. Surveys took place in the SI, TI, and SB treatments of blocks 5516, 5546, and 5547. A different block was surveyed each day and each treatment was thoroughly visited. Surveys were conducted by individuals or, in the case of birds which were difficult to track, by up to three surveyors. Behaviour surveys involved following a randomly selected bird for 10 minutes while recording behaviour and habitat use at 20 second intervals. Due to the large territory size and mobile nature of Tree Swallows and American Kestrels, it was often difficult to keep these birds in sight for the 10 minute period. In these cases, the behaviour data was collected as long as possible and entered only for that period. On occasion, birds were followed for longer than 10 minutes. Data were entered into a Microsoft Excel file. Details of fields used can be found in Appendix VI.

H. Nest Search Summary

Nests were often located as a result of behavioural surveys and incidentally as a result of point count surveys. Any cavity nesting bird suspected to be nesting in or close to the treatment areas were followed until their nest was either found or could be determined not to be in these areas. An effort was also made to locate birds that were nesting in the islands. All islands were systematically searched following morning point counts. For many of these species, nests were found. Western Wood Peewee, MacGillivray's Warbler, Ruby-crowned Kinglet, Chipping Sparrow, and Pine Siskin were all assumed to be breeding in islands but, to date, nests of these species remain unlocated. Surveys were not conducted in clear-cut and old growth areas because Mountain Bluebirds, Tree Swallows, and American Kestrels were not observed in these areas and it was deemed more important to gather data in the treatment areas. Nests located in the clear-cuts and old-growth were found incidentally. A summary of nest type and location can be found in Appendix IV.

I. Recommendations

Transects:

- Over the winter, fall, and early spring, spray paint will be faded by the sun and some flagging tape will be pulled down by storms and snow pack. In subsequent years observers will need to reflag and repaint the transects prior to commencing point counts. An effort should be made to place flagging tape at 2 metre heights as vegetation growth over the breeding season is significant.
- List of materials required for Transect remarking:
  1) 18 cans Tree and Log Marking Paint (minimum)- This seems to stand up better than normal spray paint.
  2) 20 rolls pink flagging tape (minimum)- Inevitably transects will require remarking once the vegetation grows up.
  3) 5 rolls of a brightly coloured (non-pink) flagging tape for marking 50 metre marks around points in open areas.
  4) 50 aluminum tree tags for remarking tiepoints or points with bearings. Tree tags were a popular habitat element for drumming among the woodpeckers, and several were repeatedly replaced during the census period.

Breeding Bird Surveys:

- Surveys should not continue past 09:30 as activity tends to decline towards 10:00.
- Given the very early dawn and closely spaced points it should be possible to complete up to 20 points per observer per morning.
- Bug repellent or head nets should be viewed as a necessity.

Behaviour:

- Behaviour surveys seemed to be most effective with 2 observers and one recorder, especially when following very mobile birds such as American Kestrels or Tree Swallows which are easily lost.
- Use of the blocks by the target species seemed to decline towards the intense heat of mid-afternoon. Thus behavioural sampling should occur between 10:00 and 13:00.
- Behaviour data should be entered daily in a separate file from point count data.
- In view of the small numbers of cavity nesters, in particular American Kestrels, Tree Swallows, and Mountain Bluebirds, behaviour data is based on a small sample size of birds. Many time-series should be viewed as repeat observations of the same bird.

Cavity Nest Searches:

- Mountain Bluebird and Tree Swallow nests are best located through behaviour and patient observation.
- Woodpecker nests may also be located through behaviour. Towards the end of June when young are very vocal, nests may be easily detected from a distance. A systematic journey around the edge of each block at this time should yield many previously unlocated cavities.

APPENDIX I: **Bearings and distances to permanent bird census points in the Donna Creek Study Area.**

Asterix before the Block Number marks those points that are found in islands of timber.

Block Number	Treatment Type	Point Number	Bearing to Next Point	Distance to Next Point	Location of Tiepoint
5510	CC	tie point	20°	120m	Tie-point is on a log on north side of Donna Creek ML, 135m from the 9 km sign and 112m from the culvert at the block boundary
5510	CC	1	330°	125m	
5510	CC	2	330°	125m	
5510	CC	3	240°	125m	
5510	CC	4	270°	115m	
5510	CC	5	164°	135m	
5510	CC	6	138°	180m	
5510	CC	7			
5516	OG	tie point	264°	150m	Tie point is a spruce tree at the south west corner of the block
5516	OG	1	170°	175m	
5516	OG	2	170°	175m	
5516	OG	3	170°	175m	
5516	OG	4	170°	175m	
5516	OG	5	190°	175m	
5516	OG	6	130°	175m	
5516	OG	7			

5516	CC	tie-point	30°	50m	Tie-point is on a stump at the end of Moose Ridge Road.
5516	CC	1	330	125m	
5516	CC	2	330	125m	
5516	CC	3	280	125m	
5516	CC	4	270	125m	
5516	CC	5	240	125m	
5516	CC	6	290	125m	
5516	CC	7			
5516	SB	tie-point	284	125m	Tie-point is on a stump 20m along a skid road that departs from Caribou Road, 95m past the junction with Wolf and Moose Ridge Roads.
5516	SB	1	118	125m	
5516	SB	2	134	125m	
5516	SB	3	274	125m	
5516	SB	4	166	125m	
5516	SB	5	180	125m	
5516	SB	6	292	125m	
5516	SB	7			
5516	II	tie-point	68	50m	Tie-point is on an old stump on the East side of Caribou Road at the junction with Wolf and Moose Ridge Roads
5516	II	1	310	125m	
5516	II	2	44	175m	
5516	II	3	44	115m	
5516	II	4	102	125m	
5516	II	5	243	150m	
5516	II	6			

5516	TI	tie-point	320°	50m	Tie-point is on a large log beside the road at the junction of Moose Ridge, Wolf, and Caribou roads.
5516	TI	7	54°	198m	
*5516	TI	8	140°	175m	
5516	TI	9	44°	115m	
*5516	TI	10	350°	125m	
5516	TI	11	112°	125m	
			then 170°	40m	
5516	TI	12			
5516	SI	tie-point	168°	75m	Tie-point is on a tree at the edge of the block at the end of Wolf Road.
5516	SI	1	150°	125m	
*5516	SI	2	180°	40m	
			then 130°	85m	
5516	SI	3	220°	125m	
*5516	SI	4	330°	160m	
5516	SI	5	300°	125m	
5516	SI	6	150°	198m	
5516	SI	7	200°	150m	
5516	SI	8	320°	112m	
*5516	SI	9	340°	185m	
*5516	SI	10	310°	120m	
5516	SI	11			

5546	OG	tie-point	213°	100m	Tie-point is on a log that is partially suspended over Donna Creek M/L, 150m from block 5546 and 175m from block 5547.
5546	OG	1	33°	175m	
5546	OG	2	33°	175m	
5546	OG	3	33°	175m	
5546	OG	4	33°	100m	
			then 20°	75m	
5546	OG	5	20°	175m	
5546	OG	6	20°	175m	
5546	OG	7			
5546	CC	tie-point	180°	185m	Tie-point is on a tree at the entrance to block 5546 on the North side of the road.
5546	CC	1	40°	125m	
5546	CC	2	320°	125m	
5546	CC	3	320°	125m	
5546	CC	4	10°	125m	
5546	CC	5	140°	125m	
5546	CC	6	140°	125m	
5546	CC	7			
5546	SB	tie-point	235°	150m	Tie-point is on a pine tree at the junction of Donna Creek M/L and Aquilegia Road, on the south side of road.
5546	SB	1	303°	125m	
5546	SB	2	285°	125m	
5546	SB	3	35°	128m	
5546	SB	4	35°	110m	
5546	SB	5	then 265°	25m	
			147°	125m	
5546	SB	6	130°	125m	
5546	SB	7			

5546	H	tie point	140°	100m	Tie point is on a stump 15m off Arnica Road along a skid road just before the creek. 145m from junction of roads in middle of block up Arnica road
5546	H	1	350°	170m	
*5546	H	2	330°	135m	
5546	H	3	300°	150m	
*5546	H	4	320°	155m	
5546	H	5	70°	135m	
5546	H	6	188°	190m	
*5546	H	7	140°	125m	
5546	H	8	then 40	20m	
			110°	125m	
5546	H	9	136°	125m	
5546	H	10			
5546	S1	tie point	115°	125m	Tie point is on a log on the north side of Hummer creek M1 - 15m from the block boundary at the south west corner of the block
5546	S1	1	85°	120m	
5546	S1	2	140°	120m	
*5546	S1	3	145°	105m	
*5546	S1	4	190°	115m	
5546	S1	5	130°	125m	
*5546	S1	6	97°	125m	
5546	S1	7	206°	125m	
5546	S1	8	235°	115m	
5546	S1	9	10°	165m	Bearings and distances to 5546 S1 10 measured from 5546 S1 2
5546	S1	10			

5547	OG	tie-point	320°	175m	Tie-point is on a tree at the end of a skid road that runs North-west from tie-point for 5547.TI until edge of block 5547.
5547	OG	1	240°	200m	
5547	OG	2	240°	150m	
5547	OG	3	240°	before creek	
			then 200°	after creek	
5547	OG	4	200°	150m	
5547	OG	5	200°	230m	
5547	OG	6	200°	175m	
5547	OG	7			
5547	CC	tie-point	140°	150m	Tie-point is on a log at the junction of Toad Road and Salamander Road.
5547	CC	1	270°	150m	
5547	CC	2	270°	125m	
5547	CC	3	223°	125m	
			then 150°	15m	
5547	CC	4	150°	125m	
5547	CC	5	265°	125m	
5547	CC	6	240°	125m	
5547	CC	7			
5547	SB	tie-point	180°	150m	Tie-point is on a stump near a clump of small trees at the North-west end of Toad Road, in a cul-de sac.
5547	SB	1	160°	140m	
5547	SB	2	240°	135m	
			then 140°	35m	
5547	SB	3	270°	125m	
5547	SB	4	280°	110m	
			then 235°	15m	
5547	SB	5	170°	165m	
5547	SB	6	168°	150m	
5547	SB	7			

5547	TI	tie-point	320°	50	Tie-point is on a log on the North-east side of the hairpin turn along Salamander Road.
5547	TI	1	90	125m	
*5547	TI	2	65	115m	
5547	TI	3	170	125m	
5547	TI	4	140	130m	
*5547	TI	5	180	125m	
5547	TI	6	280	120m	
*5547	TI	7	340	125m	
5547	TI	8			
5547	TI	Tie point	220	117m	Same Tie-point as for 47.TI.1.
*5547	TI	9	180	125m	
5547	TI	10	125	125m	
5547	TI	11			
5547	SI	tie point	155	150m	Tie-point is on a fir tree at the edge of the old growth at the end of Salamander Road
5547	SI	1	275	160m	
*5547	SI	2	130	145m	
5547	SI	3	192	150m	
*5547	SI	4	220	140m	
			then 280	15m	
5547	SI	5	280	135m	
*5547	SI	6	270	125m	
5547	SI	7	43	120m	
5547	SI	8	40	125m	
*5547	SI	9	133	125m	
5547	SI	10	12	125m	
5547	SI	11			

5549	CC	tie-point	60°	60m	Tiepoint is on a log near the block boundary on the East side of the Donna Creek M/L, 100m from the 18 km sign.
			then 130°	95m	
5549	CC	1	130°	135	
5549	CC	2	130°	135m	
5549	CC	3	130°	135m	
5549	CC	4	40°	135m	
5549	CC	5	330°	135m	
5549	CC	6	330°	135m	
5549	CC	7			
5550	CC	tie-point	5°	62m	Tie-point is on a stump in a small landslide track at the junction of Grizzly Bear and Cub Roads in the block centre.
5550	CC	1	350°	125m	
5550	CC	2	330°	125m	
5550	CC	3	320°	125m	
5550	CC	4	320°	125m	
5550	CC	5	210°	150m	
5550	CC	6	140°	150m	
5550	CC	7			

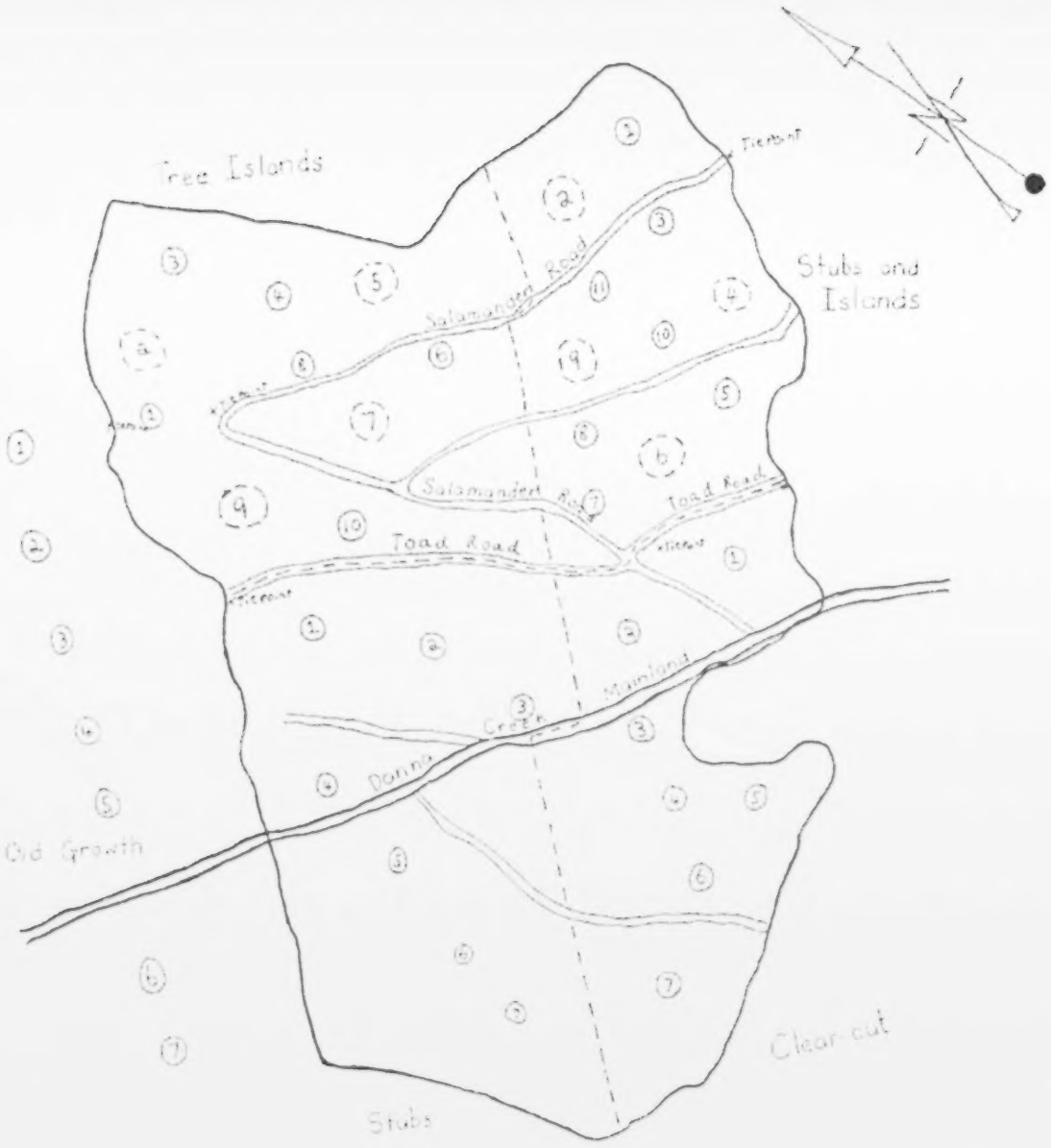
5510

5516

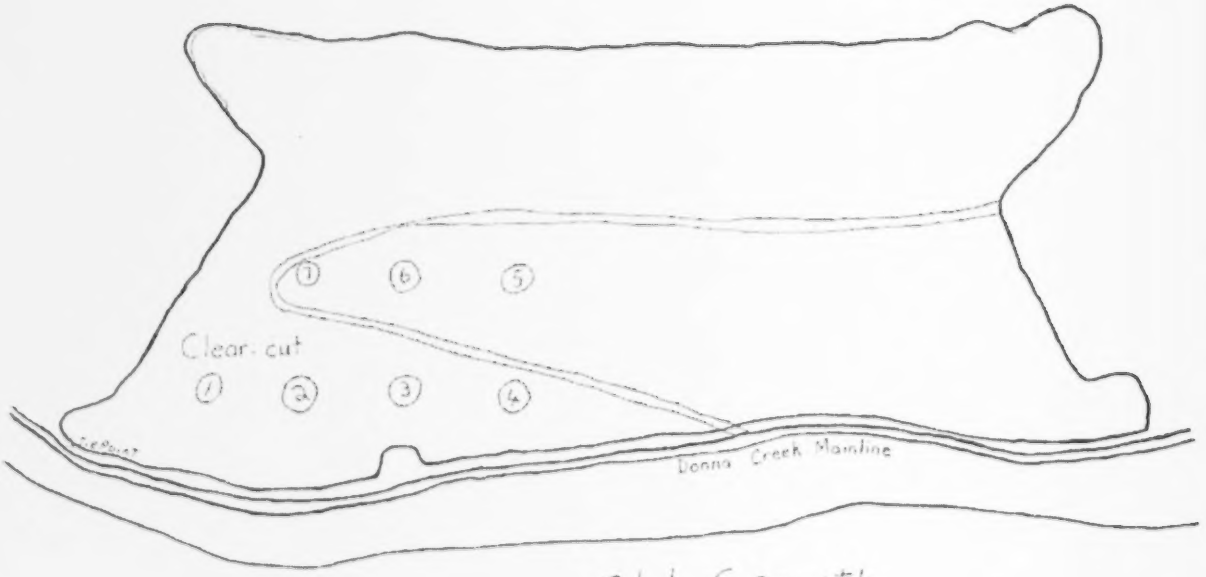
Moose Ridge Road
Clear-cut
Tree Islands
Wolf Road
Caribou Road
Shrubs and Islands
Caribou Road
Shrubs
Tree Islands
Old Growth

5546
Tree Islands
Clear-cut
Old Growth
Arnica Road
Firewood terrace
Monkshood drive
Monkshood drive
Donna Crees Manage
Aquilegia Crescent
Stubs and Islands
Stubs

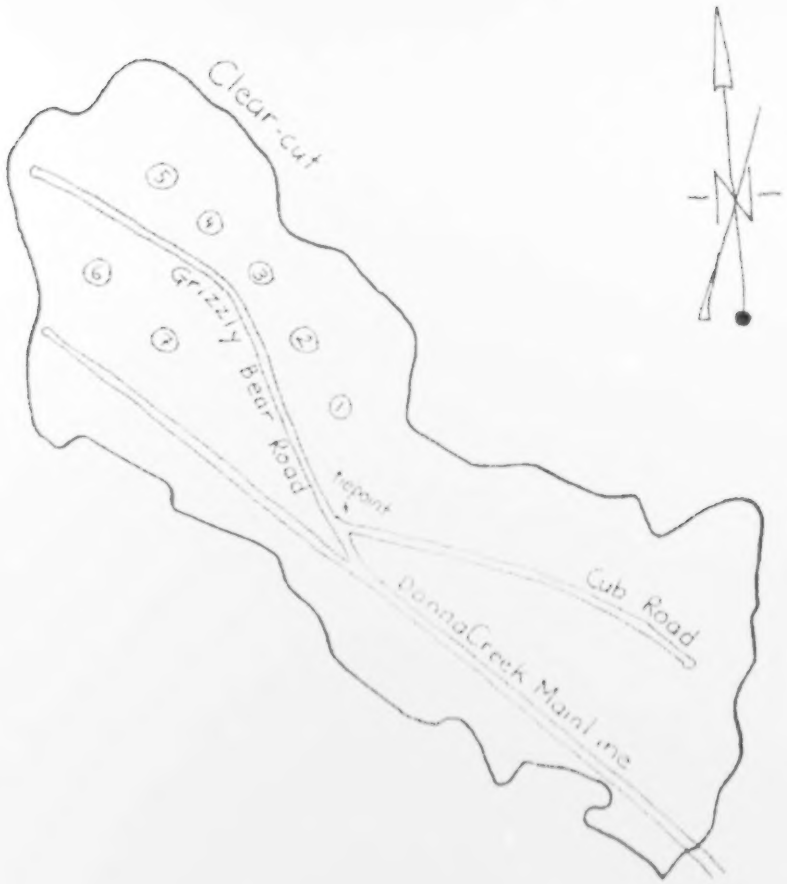
5547


Tree Islands
Stubs and Islands
Old Growth
Stubs
Clear cut
Salamander Road
Toad Road
Mainland
Creek

5549



5550



APPENDIX III: Survey Timing

Transect Layout	May 16 ------> May 22
Round One	May 22 ------> May 24
Round Two	May 25 ------> May 30
Round Three	May 31 ------> June 3
Round Four	June 4 ------> June 7
Round Five	June 8 ------> June 10
Round Six	June 11 ------> June 16
Round Seven	June 16 ------> June 26

APPENDIX IV: Island Measurements

Point	Bottom to Point	Point to Top	Left to Point	Point to Right	Total	Area in Hectares
16.TI.2	42m	25 m	20 m	39 m	67m*59m	0.40
16.TI.3	27m	156 m	36 m	65 m	183m*101m	1.85
16.TI.4	142m	41 m	????	46 m	183m*???	?????
16.TI.8	26m	40m	17 m	31 m	66m*48m	0.32
16.TI.10	24m	22 m	30 m	30 m	46m*60m	0.28
16.SI.2	19m	25 m	24 m	40m	44m*64m	0.28
16.SI.4	29m	24 m	25 m	33 m	53m*58m	0.31
16.SI.9	16m	21 m	33 m	38 m	37m*71m	0.26
16.SI.10	25m	19m	33 m	27 m	44m*60m	0.26
46.TI.2	25m	35 m	21 m	36 m	60m*57m	0.34
46.TI.4	35 m	32 m	28m	20 m	67m*48m	0.32
46.TI.7	15 m	22 m	24 m	35 m	37m*59m	0.22
46.SI.3	28m	22 m	35 m	35 m	50m*70m	0.35
46.SI.4	22 m	35 m	15 m	27 m	57m*42m	0.24
46.SI.6	24 m	56m	11 m	35 m	80m*46m	0.37
47.TI.2	33 m	21 m	30 m	32 m	54m*62m	0.33
47.TI.5	24 m	26 m	14 m	31 m	50m*45m	0.23
47.TI.7	40m	20 m	17 m	13 m	60m*30m	0.18
47.TI.9	30 m	20 m	18 m	37 m	50m*55m	0.28
47.SI.2	33 m	34 m	28 m	19 m	67m*47m	0.31
47.SI.4	29 m	19 m	24 m	23 m	43m*47m	0.23
47.SI.6	36 m	22 m	25 m	22 m	56m*49m	0.27
47.SI.9	27 m	27 m	28 m	27 m	54m*55m	0.30

Appendix V: Nest Search Summary

SPECIES	NEST TYPE	TREE SPECIES	FEATURE USED TO BUILD NEST	BLOCK NUMBER	TREATMENT	SITE INFORMATION
MOBL	Cavity	Subalpine Fir	Stub	5547	SB	Edge of SB and CC Treatments
MOBL	Cavity	Subalpine Fir	Stub	5546	SB	Near SI/SB Boundary
MOBL	Cavity	Subalpine Fir	Stub	5516	SB	Natural Cavity Crack in Stub
MOBL	Cavity	Subalpine Fir	Snag	5516	SI	Edge of Island
MOBL	Cavity	Subalpine Fir	Snag	5516	SI	Island 16.SI.9
HAWO	Cavity	Subalpine Fir	Snag	5547	TI	Island TI7
RBNU	Cavity	Engelmann Spruce	Live Tree	5546	OG	Next to SI Treatment
RBMU	Cavity	Subalpine Fir	Snag	5516	SI	Island 16.SI.10
BBWO	Cavity	Lodgepole Pine	Snag	5516	TI	TI 10 Island Edge
BBWO	Cavity	Engelmann Spruce	Stub	5516	SB	Close to OG
BBWO	Cavity	Subalpine Fir	Stub	5516	SB	Close to SB/TI Boundary
BBWO	Cavity	Subalpine Fir	Snag	5547	SI	Edge of Island
BBWO	Cavity	Subalpine Fir	Live Tree	5546	SI	Island SI6
TTWO	Cavity	Engelmann Spruce	Live Tree	5546	OG	In Gully at Border of Block and TI Treatment
TTWO	Cavity	Engelmann Spruce	Stub	5547	TI	Edge of Island TI9
TTWO	Cavity	Lodgepole Pine	Snag	5547	OG	Edge of SB Treatment
TTWO	Cavity	Subalpine Fir	Snag	5516	OG	Edge of SI Treatment
TTWO	Cavity	Engelmann Spruce	Stub	5516	SB	Next to OG
TTWO	Cavity	Engelmann Spruce	Stub	5546	TI	Edgeofisland46.TI.2
TTWO	Cavity	Engelmann Spruce	Live Tree	5549	OG	Edge of CC
TTWO	Cavity	Engelmann Spruce	Live Tree	5516	OG	Edge Next to SI
TTWO	Cavity	Engelmann Spruce	Live Tree	5546	OG	Edge Next to Donna Creek Main Line

TRSW	Cavity	Engelmann Spruce	Stub	5516	SB	Near to OG
TRSW	Cavity	Subalpine Fir	Snag	5547	TI	Island TI9
TRSW	Cavity	Engelmann Spruce	Stub	5549	CC	In a 3 Meter Stub Left in CC
TRSW	Cavity	Subalpine Fir	Stub	5516	SB	Close to SB/TI Boundary
RESQ	Cavity	Engelmann Spruce	Live Tree	5546	SI	Island SO
AMRO	Cup	Engelmann Spruce	Live Tree	5516	SI	Island SI2
AMRO	Cup	Subalpine Fir	Snag	5516	TI	Island TI 10
AMRO	Cup	Subalpine Fir	Fallen Tree	5516	SI	Island SI9
AMRO	Cup	Subalpine Fir	Live Tree	5546	TI	Island TI4
AMRO	Cup	Engelmann Spruce	Stump	5546	TI	Island TI8
AMRO	Cup	Subalpine Fir	Snag Root Pad	5546	SI	Island SI6
AMRO	Cup	Engelmann Spruce	Root Pad	5547	SI	Island SI6
SWTH	Cup	Subalpine Fir	Live Tree	5546	TI	IslaiidTI5
YRWA	Cup	Subalpine Fir	Live Tree	5516	TI	In Large Island
WIWA	Cup	N/A	Ground	5516	SI	Island SI9
WIWA	Cup	N/A	Ground	5547	TI	Island TI5
BLWA	Cup	Subalpine Fir	Live Tree	5547	OG	25 Meters to Cutblock Edge
VATH	Cup	Subalpine Fir	Live Tree	5516	OG	
VATH	Cup	Subalpine Fir	Live Tree	5547	OG	
DEJU	Cup	N/A	Ground	5516	SI	Next to an Island
DEJU	Cup	N/A	Ground	5546	SI	Next to an Island
DEJU	Cup	N/A	Ground	5516	SI	
LISP	Cup	N/A	Ground	5547	SI	Near to an Island

Appendix VI: Data Management

Breeding Bird Surveys:

Block	Cutblock Number (eg.5510)
Treatment	Treatment Type (e.g.. CC)
Point Number	Number of Point Sampled (e.g.. 1)
Census Replicate	Replicate Number
Time	Time Point Commenced (e.g.. 4:15)
Date	Date Sampled (Year/Month/Day)(e.g.. 95/06/15)
Observer	Who Sampled that Point (e.g.. JBJ)
Species Code	Which Bird Species were recorded (e.g.. SSHA)
Activity Code	S=singing, C=calling, V=visual, N=nesting, O=overflight, M=moving,
Habitat Feature	Habitat element being used (e.g. Stub, Small Conifer, Slash)

Behavioural Surveys:

Species	Species being observed (e.g.. MOBL)
Sex	Sex of species observed (e.g. FEMALE)
Date	Date observations took place (e.g. 95/06/12)
Time (Every 20 Seconds)	Time observation took place (e.g.. 10:00:20)
Block	Block in which observations took place (e.g.. 5547)
Treatment	Treatment in which observation took place (e.g. CC)
Behaviour	Activity observed (e.g. Preening)
Habitat Feature	Habitat element being used (e.g. Stub)

Appendix VII: Interesting Observational Notes

- A Three-toed Woodpecker and a Tree Swallow were observed nesting in the same three metre stub. This occurred near the stub/old growth treatment boundary of block 5516.

- On June 22 in the stub treatment of block 5516, a male Black-backed Woodpecker fledgling left it's nest in a 3 metre stub while Tree Swallows sang from the top of the stub. Several hours later the Tree Swallows were observed going in and out of the cavity. Days later the Swallows continued to use the cavity.

- Gray-cheeked Thrushes were observed singing in the Donna Creek Study area from the old growth treatment between blocks 5546 and 5547. They were also observed singing from the old growth outside the treatment area between blocks 5546 and 5547. They were present between June 19th and June 21st. This is consistent with, though later than the migration observed during the 1993 surveys. These birds are expected to be found mainly on the Eastern side of the Rocky Mountains during spring migration.

- A territorial male Pacific-slope Flycatcher was found near the creek at the fourth point in the 5547 old growth treatment. This is far out of it's expected range. This singing male was present from June 8th until we left the area on June 28th.

- Outside the survey area in the old growth surrounding block 5550, a Northern Ricker of the Yellow-shafted race was observed.

- Spruce Grouse seen in the area were both *canadensis* and *franklinii* races.

- A Boreal Owl was recorded during a point count at the seventh point of the 5516 old growth transect. It was subsequently heard in the vicinity of the 5516 old growth transect for the duration of the project.

- Outside the survey area in the old growth surrounding block 5550 a Northern Pygmy Owl was heard on several days throughout our stay in Donna Creek.

- Only one American Kestrel pair was observed in the study area. The pair used the stub, island, and stubs and islands treatments of cutblocks 5516, 5546, 5547 daily for foraging and roosting.

- The vegetation community in block 5510 was quite different from the other clear-cut control areas Dense Alder thickets, high brush, and marsh like conditions characterize this block. The different vegetation present in this block likely accounts for the differences in bird diversity between this and other clear-cut control areas.

APPENDIX VIII: Species Lists

A. Species recorded during point counts in the Donna Creek study area during the breeding season.

1. Solitary Sandpiper *(Tringa solitaria)*
2. Spotted Sandpiper *(Actitis macularia)*
3. Common Snipe *(Gallinago gallinago)*
4. Sharp-shinned Hawk *(Accipiter striatus)*
5. Red-tailed Hawk *(Buteo jamaicensis)*
6. American Kestrel *(Falco sparverius)*
7. Ruffed Grouse *(Bonasa umbellus)*
8. Spruce Grouse *(Dendragopus canadensis)*
9. Boreal Owl *(Aegolius funereus)*
10. Common Nighthawk *(Cordeiles minor)*
11. Hairy Woodpecker *(Picoides villosus)*
12. Three-toed Woodpecker *(Picoides tridactylus)*
13. Black-backed Woodpecker *(Picoides arcticus)*
14. Olive-sided Flycatcher *(Contopus borealis)*
15. Western Wood Pewee *(Contopus sordidulus)*
16. Hammond's Flycatcher *(Empidonax hammondii)*
17. Alder Flycatcher *(Empidonax alnorum)*
18. Yellow-bellied Flycatcher *(Empidonax flaviventris)*
19. Pacific-slope Flycatcher *(Empidonax difficilus)*
20. Tree Swallow *(Tachcineta bicolor)*
21. Steller's Jay *(Cyanositta stelleri)*
22. Gray Jay *(Perisoreus canadensis)*
23. Common Raven *(Corvus corax)*
24. Boreal Chickadee *(Parus hudsonicus)*
25. Red-breasted Nuthatch *(Sitta canadensis)*
26. Brown Creeper *(Certthia americana)*
27. Winter Wren *(Troglodytes troglodytes)*
28. Golden-Crowned Kinglet *(Regulus satrapa)*
29. Ruby-Crowned Kinglet *(Regulus calendula)*
30. Mountain Bluebird *(Sialia mexicana)*
31. Townsend's Solitaire *(Myadestes townsendi)*
32. Swainson's Thrush *(Catharus ustulatus)*
33. Hermit Thrush *(Catharus guttatus)*
34. Varied Thrush *(Ixoreus naevius)*
35. American Robin *(Turdus migratorius)*
36. American Pipit *(Anthus rubescens)*

37. Solitary Vireo *(Vireo solitarius)*
38. Warbling Vireo *(Vireo gilvus)*
39. Tennessee Warbler *(Vermivora peregrina)*
40. Orange-crowned Warbler *(Vermivora celata)*
41. Yellow-rumped Warbler *(Dendroica coronata)*
42. Townsend's Warbler *(Dendroica townsendi)*
43. Blackpoll Warbler *(Dendroica striata)*
44. Yellow Warbler *(Dendroica petechia)*
45. MacGillivray's Warbler *(Oporornis tolmiei)*
46. Wilson's Warbler *(Wilsonia pusilla)*
47. Northern Waterthrush *(Seiurus novoboracensis)*
48. Savannah Sparrow *(Passerculus sandwichensis)*
49. Chipping Sparrow *(Spizella passerinus)*
50. Clay-colored Sparrow *(Spizella pallida)*
51. Dark-eyed Junco *(Junco hyemalis)*
52. White-crowned Sparrow *(Zonotrichia leucophyrs)*
53. Golden-crowned Sparrow *(Zonotrichia atricapilla)*
54. Fox Sparrow *(Passerella iliaca)*
55. Lincoln Sparrow *(Melospiza lincolnii)*
56. Brewer's Blackbird *(Euphagus cyanocephalus)*
57. Western Tanager *(Piranga ludoviciana)*
58. Pine Siskin *(Carduelis pinus)*
59. Red Crossbill *(Loxia curvirostra)*
60. Pine Grosbeak *(Pinicola enucleator)*
61. Evening Grosbeak *(Coccothraustes vespertinus)*

B. Species recorded in the Donna Creek drainage during the breeding season.

1. Canada Goose *(Branta canadensis)*
2. Mallard *(Anas platyrhnchos)*
3. Green-winged Teal *(Anascrecca)*
4. Greater Yellowlegs *(Tringa melanoleuca)*
5. Solitary Sandpiper *(Tringa solitaria)*
6. Spotted Sandpiper *(Actitis macularia)*
7. Common Snipe *(Gallinago gallinago)*
8. Northern Harrier *(Circus cyaneus)*
9. Sharp-shinned Hawk *(Accipiter striatus)*
10. Red-tailed Hawk *(Buteo jamaicensis)*
11. American Kestrel *(Falco sparverius)*
12. Ruffed Grouse *(Bonasa umbellus)*
13. Spruce Grouse *(Dendragopus canadensis)*
14. Blue Grouse *(Dendragopus obscurus)*
15. Northern Pygmy Owl *(Glaucidium gnoma)*
16. Boreal Owl *(Aegolius funereus)*
17. Common Nighthawk *(Cordeiles minor)*
18. Rufous Hummingbird *(Selasphorus rufus)*
19. Northern Flicker *(Colaptes auratus)*
20. Hairy Woodpecker *(Picoides villosus)*
21. Three-toed Woodpecker *(Picoides tridactylus)*
22. Black-backed Woodpecker *(Picoides arcticus)*
23. Olive-sided Flycatcher *(Contopus borealis)*
24. Western Wood Pewee *(Contopus sordidulus)*
25. Say's Phoebe *(Sayornis soya)*
26. Hammond's Flycatcher *(Empidonax hammondii)*
27. Least Flycatcher *(Empidonax minimus)*
28. Alder Flycatcher *(Empidonax alnorum)*
29. Yellow-bellied Flycatcher *(Empidonax flaviventris)*
30. Pacific-slope Flycatcher *(Empidonax difficilus)*
31. Tree Swallow *(Tachcineta bicolor)*
32. Barn Swallow *(Hirunda rustica)*
33. Steller's Jay *(Cyanositta stelleri)*
34. Gray Jay *(Perisoreus canadensis)*
35. Common Raven *(Corvus corax)*
36. Boreal Chickadee *(Parus hudsonicus)*
37. Red-breasted Nuthatch *(Sitta canadensis)*

38. Brown Creeper *(Certthia americana)*
39. Winter Wren *(Troglodytes troglodytes)*
40. Golden-Crowned Kinglet *(Regulus satrapa)*
41. Ruby-Crowned Kinglet *(Regulus calendula)*
42. Mountain Bluebird *(Sialia mexicana)*
43. Townsend's Solitaire *(Myadestes townsendi)*
44. Swainson's Thrush *(Catharus ustulatus)*
45. Gray-cheeked Thrush *(Catharus minimus)*
46. Hermit Thrush *(Catharus guttatus)*
47. Varied Thrush *(Ixoreus naevius)*
48. American Robin *(Turdus migratorius)*
49. American Pipit *(Anthus rubescens)*
50. Cedar Waxwing *(Bombycilla cedrodum)*
51. Solitary Vireo *(Vireo solitarius)*
52. Warbling Vireo *(Vireo gilvus)*
53. Tennessee Warbler *(Vermivora peregrina)*
54. Orange-crowned Warbler *(Vermivora celata)*
55. Yellow-rumped Warbler *(Dendroica coronata)*
56. Townsend's Warbler *(Dendroica townsendi)*
57. Blackpoll Warbler *(Dendroica striata)*
58. Yellow Warbler *(Dendroica petechia)*
59. MacGillivray's Warbler *(Oporornis tolmiei)*
60. Wilson's Warbler *(Wilsonia pusilla)*
61. Northern Waterthrush *(Seiurus novoboracensis)*
62. Common Yellow-throat *(Geothlypis trichas)*
63. American Redstart *(Setophaga ruticella)*
64. Savannah Sparrow *(Passerculus sandwichensis)*
65. Chipping Sparrow *(Spizella passerinus)*
66. Clay-colored Sparrow *(Spizella pallida)*
67. Dark-eyed Junco *(Junco hyemalis)*
68. White-crowned Sparrow *(Zonotrichia leucophyrs)*
69. Golden-crowned Sparrow *(Zonotrichia atricapilla)*
70. Fox Sparrow *(Passerella iliaca)*
71. Lincoln Sparrow *(Melospiza lincolnii)*
72. Brewer's Blackbird *(Euphagus cyanocephalus)*
73. Western Tanager *(Piranga ludoviciana)*
74. Pine Siskin *(Carduelis pinus)*
75. Red Crossbill *(Loxia curvirostra)*

76. White-winged Crossbill *(Loxia leucoptera)*

77. Pine Grosbeak *(Pinicola enucleator)*

78. Evening Grosbeak *(Coccothraustes vespertinus)*